

11-19779/ JP  
JP: 07/06/00

07/12/1999 1/9

120

WHAT IS CLAIMED IS:

43-1270-1-1

1. An alkali development type photocurable composition, comprising in combination:

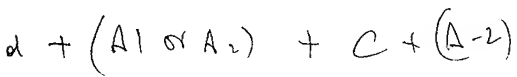
(A) an alkali-soluble macromolecular binder having a weight-average molecular weight in the range of 5,000 to 100,000 and an acid value in the range of 50 to 150 mg KOH/g, possessing no ethylenically unsaturated double bond, and obtained by causing (d) a compound possessing one glycidyl group and no ethylenically unsaturated double bond in its molecule to react with

a carboxyl group of (A-1) a copolymer of (a) an ethylenically unsaturated bond-containing compound possessing one carboxyl group in its molecule with (b) an ethylenically unsaturated bond-containing compound possessing neither hydroxyl group nor acidic group in its molecule, the copolymer possessing no glycidyl group, or

a carboxyl group of (A-2) a copolymer of (a) an ethylenically unsaturated bond-containing compound possessing one carboxyl group in its molecule with (b) an ethylenically unsaturated bond-containing compound possessing neither hydroxyl group nor acidic group in its molecule and (c) an ethylenically unsaturated bond-containing compound possessing a hydroxyl group, the copolymer possessing no glycidyl group, and

then causing (e) a polybasic acid anhydride to react with a secondary hydroxyl group caused by the above reaction and a primary hydroxyl group of the copolymer (A-2),

Methacrylic Acid



10-87767

112

- (B) an inorganic powder,
- (C) a photopolymerizable monomer,
- (D) a photopolymerization initiator, and
- (E) an organic solvent.

5        2. The composition according to claim (1) further comprising (F) a stabilizer.

3. The composition according to claim (1), wherein said inorganic powder (B) incorporates therein a low melting glass frit in an amount accounting for a portion of not  
10    less than 5% by weight thereof.

4. The composition according to claim (3), wherein said low melting glass frit is selected from the group consisting of:

a) an amorphous frit which contains lead oxide as a main  
15    component and has a composition (in percent by weight of oxide basis) 48-82% of PbO, 0.5-22% of B<sub>2</sub>O<sub>3</sub>, 3-32% of SiO<sub>2</sub>, 0-12% of Al<sub>2</sub>O<sub>3</sub>, 0-10% of BaO, 0-15% of ZnO, 0-2.5% of TiO<sub>2</sub>, and 0-25% of Bi<sub>2</sub>O<sub>3</sub>, and has a softening point in the range of 420-590°C.

20    b) an amorphous frit which contains bismuth oxide as a main component and has a composition (in percent by weight of oxide basis) 35-88% of Bi<sub>2</sub>O<sub>3</sub>, 5-30% of B<sub>2</sub>O<sub>3</sub>, 0-20% of SiO<sub>2</sub>, 0-5% of Al<sub>2</sub>O<sub>3</sub>, 1-25% of BaO, and 1-20% of ZnO and has a softening point in the range of 420-590°C,

25    c) an amorphous frit which contains zinc oxide as a main component and has a composition of (in percent by weight of oxide basis) 25-60% of ZnO, 2-15% of K<sub>2</sub>O, 25-45% of B<sub>2</sub>O<sub>3</sub>, 1-7% of SiO<sub>2</sub>, 0-10% of Al<sub>2</sub>O<sub>3</sub>, 0-20% of BaO, and 0-10% of MgO and has a softening point in the range of 420-590°C,

and

d). an amorphous frit which contains lithium oxide as a main component and has a composition of (in percent by weight of oxide basis) 1-13% of  $\text{Li}_2\text{O}$ , 0-30% of  $\text{Bi}_2\text{O}_3$ , 1-50% of  $\text{B}_2\text{O}_3$ , 1-50% of  $\text{SiO}_2$ , 1-40% of  $\text{Al}_2\text{O}_3$ , 1-20% of  $\text{BaO}$ , and 1-25% of  $\text{ZnO}$  and has a softening point in the range of 420-590°C.

5. The composition according to claim (1), wherein said inorganic powder (B) contains at least one member selected from the group consisting of a metal powder, a glass powder, a black pigment, and ceramic fine particles.

6. The composition according to claim (1) wherein said inorganic powder (B) contains a black pigment formed of a metal oxide containing at least one element selected from the group consisting of Fe, Co, Cu, Cr, Mn, and Al as a main component thereof and/or an electroconductive metal powder (or) electroconductive fine black particles containing at least one element selected from the group consisting of Ag, Au, Pd, Ni, Ru, Cu, Al, and Pt.

7. The composition according to claim (1), wherein said inorganic powder (B) contains at least one ceramic selected from the group consisting of alumina, cordierite, and zircon.

8. The composition according to claim (2), wherein said stabilizer (F) is at least one compound selected from the group consisting of inorganic acids, organic acids, inorganic phosphoric acids, and organic phosphoric acids.

9. The composition according to claim (3), wherein said glass frit has an average particle diameter of not more

than 10  $\mu$ m and is present in an amount of 25 to 1,000 parts by weight, based on 100 parts by weight of said alkali-soluble macromolecular binder (A).

10. The composition according to claim (6), wherein  
5 said electroconductive metal powder has an average particle diameter of not more than 10  $\mu$ m and is present in an amount of 25 to 1,000 parts by weight, based on 100 parts by weight of said alkali-soluble macromolecular binder (A).

10 11. The composition according to claim (1), wherein said photopolymerizable monomer (C) is present in an amount of 1 to 200 parts by weight, based on 100 parts by weight of said alkali-soluble macromolecular binder (A).

15 12. The composition according to claim (1), wherein said photopolymerization initiator (D) is present in an amount of 1 to 20 parts by weight, based on 100 parts by weight of said alkali-soluble macromolecular binder (A).

13. The composition according to claim (2), wherein said stabilizer (F) is present in an amount of not more  
20 than 5 parts by weight, based on 100 parts by weight of said inorganic powder (B).

14. The composition according to claim (1), which is in the form of paste.

15 15. The composition according to claim (1), which is formed in the form of film.

16. A calcined pattern obtained by patterning a film of the alkali development type photocurable composition according to claim (1) formed in close adhesion on a substrate and then calcining the patterned film.